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SPECIAL PAMPHLET

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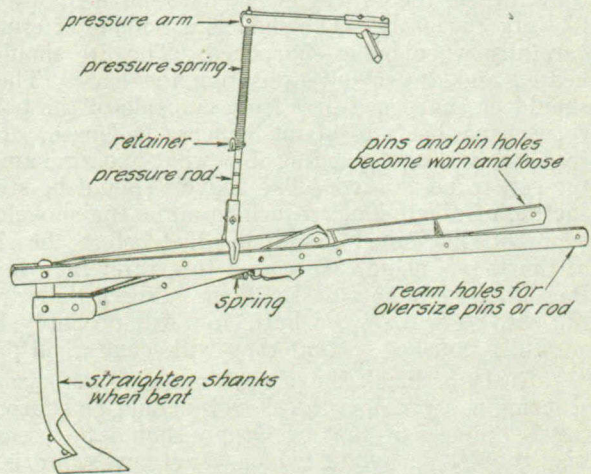
No. 79



Field Cultivator Maintenance and Operation

The field cultivator is an efficient machine for tillage and weed control when the shovels are sharp and the gangs are in alignment. The gangs of the cultivator frequently become loose or bent, so that the shovels are not held rigidly in line. The cause of most of the looseness is due to worn gang draw pins. It is usually wise to put in oversize pins or a long pump rod through all of the gang draw holes, where it is possible to get a rod in through the frame. Where the gangs are bent, they should be removed and straightened, so that the shanks of the cultivator are upright, making it possible for the shovels to run flat and level.

The pressure springs and pressure spring adjustments must be checked and uniform pressure applied to each shovel. Where the pressure rod and spring retainers are worn badly, they should be replaced. If it is difficult to get parts, they may be built up by welding. It is important that the pressure arms, springs, rods, and retainers are in condition to operate throughout the season without failure. The pressure arms should be tight and in proper alignment with the drag bars.



CULTIVATOR ADJUSTMENTS

Wheels and Axles.—The cultivator wheel bearings may be badly worn or out of alignment. If so, new bearings may be placed in the wheels and the axles may be built up, where building up is more economical than replacement. It is desirable to repair by building up as much as possible rather than purchase replacements, in order that repairs may be conserved. The blacksmiths and repairmen are well equipped with welders which makes possible many repairs without replacement of new parts. When the axles are bent or out of alignment, they should be loosened on the frame and straightened so that the wheels will run straight with about $\frac{1}{2}$ inch toe-in. The wheels tends to drag and overload the machine when they are operating out of alignment.

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Power Lift.—The power lift and linkage should be cleaned to remove dirt and grease. In order to properly clean the power lift, it must be taken apart, thoroughly scraped and washed with kerosene. While cleaning the mechanism of the power lift, it may be inspected for wear and necessary repairs or adjustments provided. The chain drive of the power lift should be assembled with the hook of the links forward in the direction of the chain travel. The tightener should be in alignment with the chain. Do not operate the chain with too much tension. A slow moving chain operating on light load will last longer if kept clean and run without lubrication.

Draw Bar and Levelling.—When the cultivator is drawn from the same hole in the vertical clevis year after year the hole becomes badly worn and it may be filled by welding. The vertical clevis may be reversed, or reinforced with half-inch plates bolted on each side, so that more material will be available to resist the wear of the draw bar pins. The vertical adjustment of the draw bar provides a range for levelling the machine and maintaining even depth on all gangs. The tilt of the individual shovel is provided by an adjustable linkage on each standard. The shovels should not be tilted to provide penetration where shovels are dull and the points are worn so that they are flat and without suction. The quality of work is poor and the draught is high whenever a cultivator is operated with the shanks tilted so that the shovels are operating on their points.

Lubrication.—All bolts should be tightened, and all grease nipples inspected, so that the working parts may be easily lubricated.

Sharpening.—The shovels of the cultivator require the most attention as they furnish the cutting edge. The shovels must be sharp and scouring in order to work efficiently. The shovels are made of crucible steel, and must be heated carefully when being sharpened. The fire should be in good shape, the point heated and drawn out first from the back. The edge of the duck-foot shovel should be sharpened first from one side of the point and then from the other in consecutive heats of about 3 inches in length. The edges should be drawn out reasonably thin, depending somewhat upon the amount of stone and the nature of the soil to be worked. The shovels should be straightened and the point given suction of about $\frac{1}{8}$ of an inch to allow the shovel to penetrate the ground. The edges of the shovel should be filed before the shovel is hardened. The edges of the shovel should be heated to a faint red, dipped in water for a second and then allowed to cool on the floor. Where they are fully quenched in the water, the shovels will be too hard and will probably break. The shovels should be carefully polished so that they will scour when put in the soil.

Rusty or black shovels are not satisfactory. In the heavy clay soils where scouring is a problem the shovels should be sharpened frequently and drawn out thin. Shovels of narrow design should be used as these tend to clean more readily. A cultivator which does not scour is not an efficient weed-killing machine.

Efficient Operation.—Complete weed cutting at shallow depth without excessive soil pulverizing is most desirable from the standpoint of both quality of work and economical performance. Deep tillage increases the draught out of proportion while the quality of work from a weed-killing standpoint is inferior.

The speed of operation has an effect upon both quality of performance and economy. Speeds of from three and one-half to four miles per hour have proved to be most satisfactory. Higher speeds result in low quality of work due to uneven penetration and increase the cost per acre.

Western Agricultural Engineering Committee.